

Libby Superfund Site Risk Assessment

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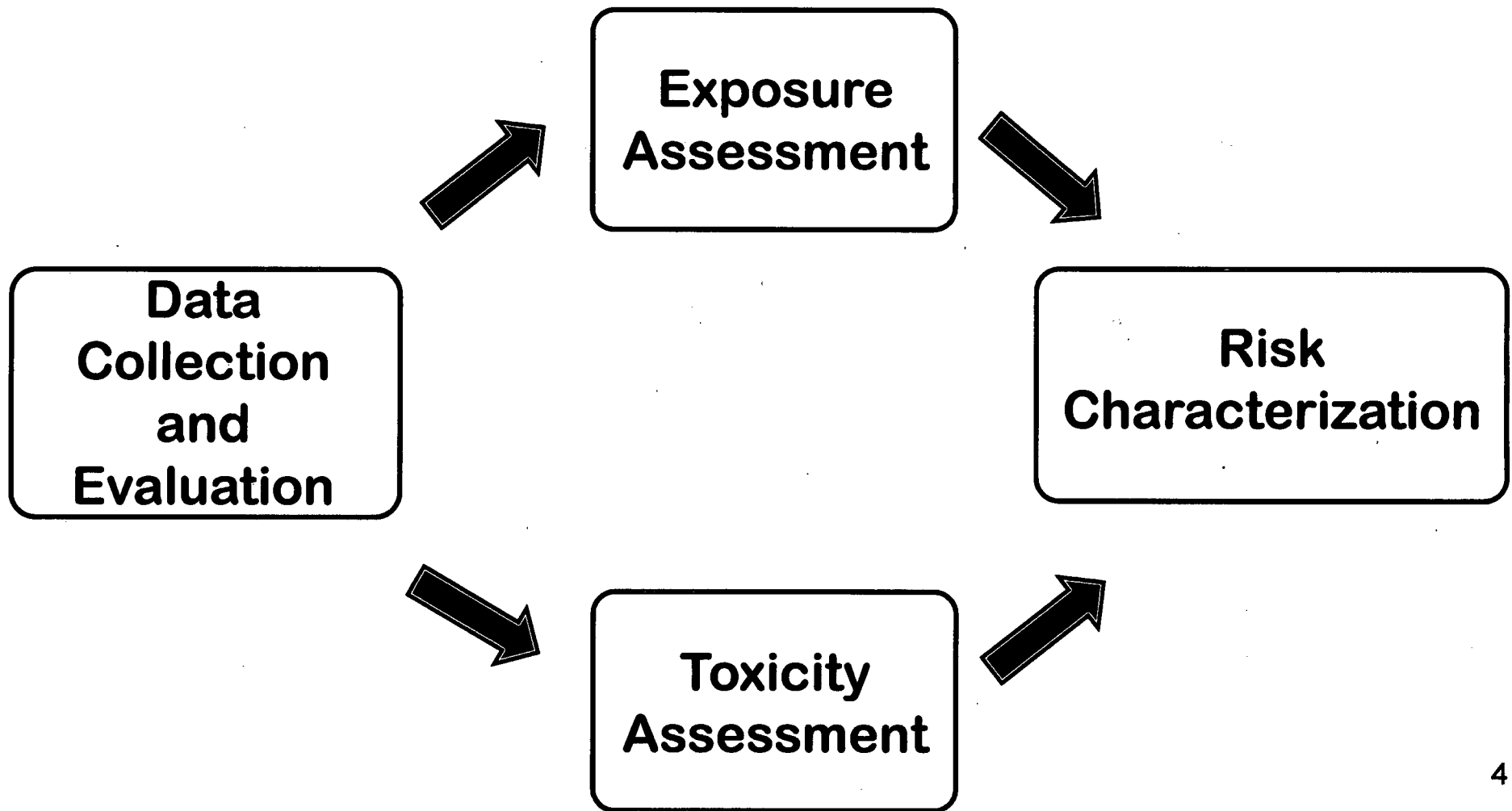
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Role of the Baseline Risk Assessment in Superfund*

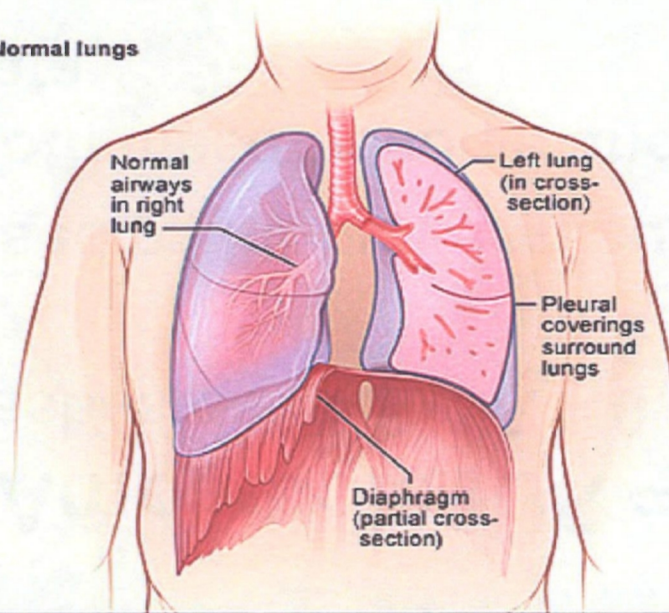
- The primary purpose of the baseline risk assessment is to provide risk managers with an understanding of the actual and potential risks to human health and the environment posed by the site and any uncertainties associated with the assessment. This information may be useful in determining whether a current or potential threat to human health or the environment exists that warrants remedial action.

Four Steps of Risk Assessment



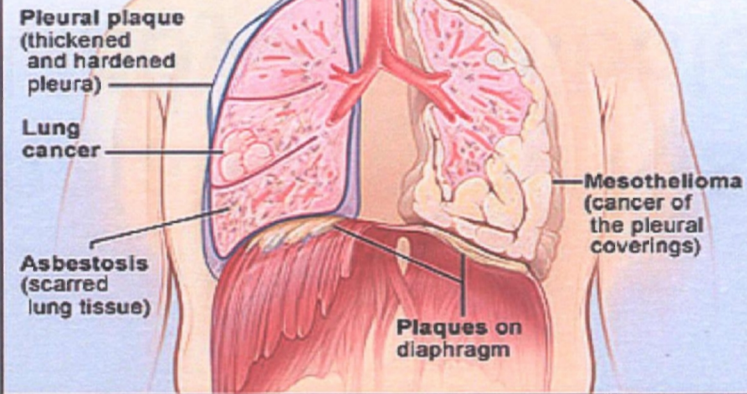
Asbestos-Related Diseases

A Normal lungs



B

Lungs with asbestos-related disease



Cancer Inhalation Unit Risk (IUR) for Libby Amphibole

**Draft Libby Amphibole IUR = 0.17 (f/cc)^{-1}
(existing asbestos IRIS IUR = 0.23 (f/cc)^{-1})**

- Number based on Libby Vermiculite Miner data**
- Based on both mesothelioma and lung cancer mortality data**

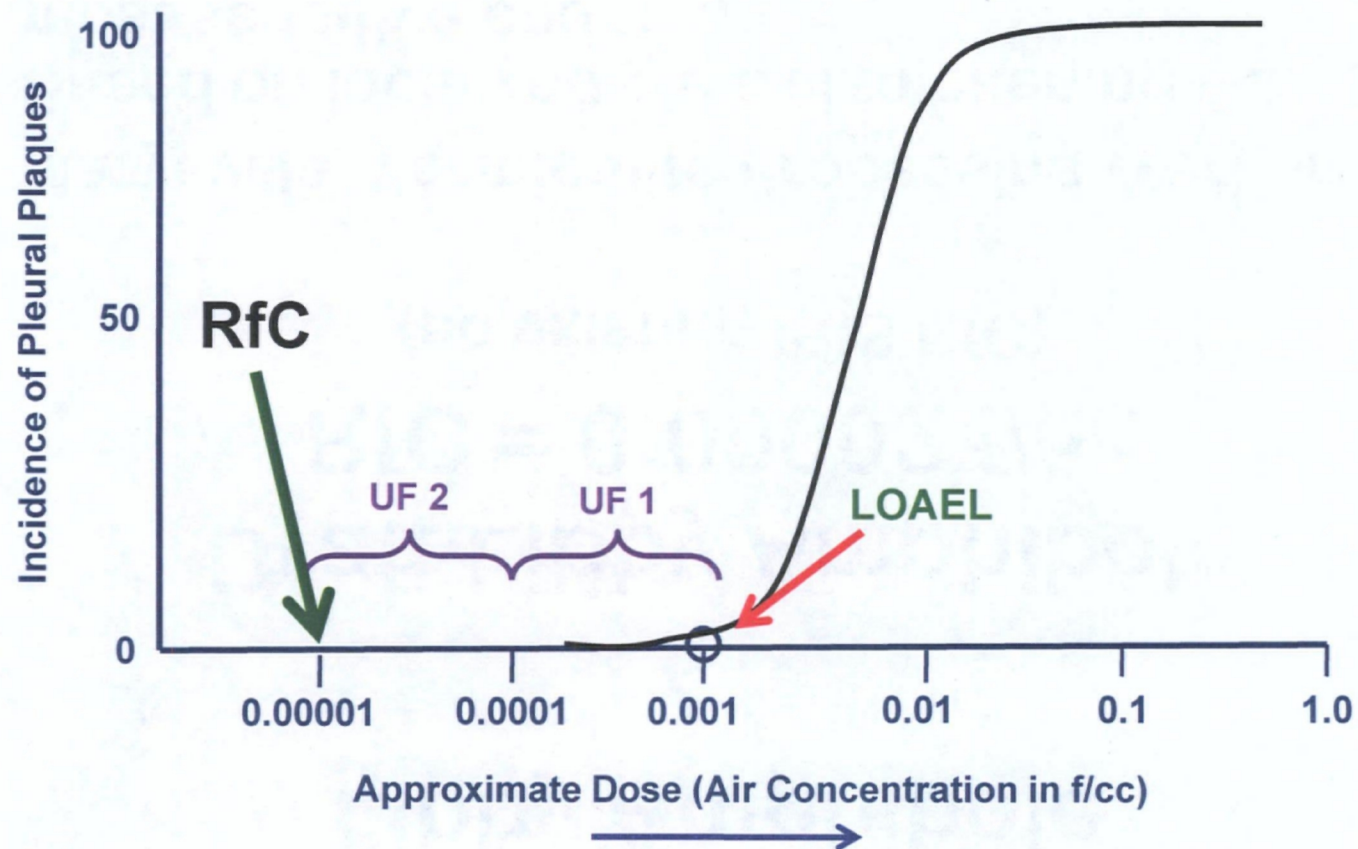
Draft Noncancer Toxicity Value for Libby Amphibole

Draft Libby Amphibole

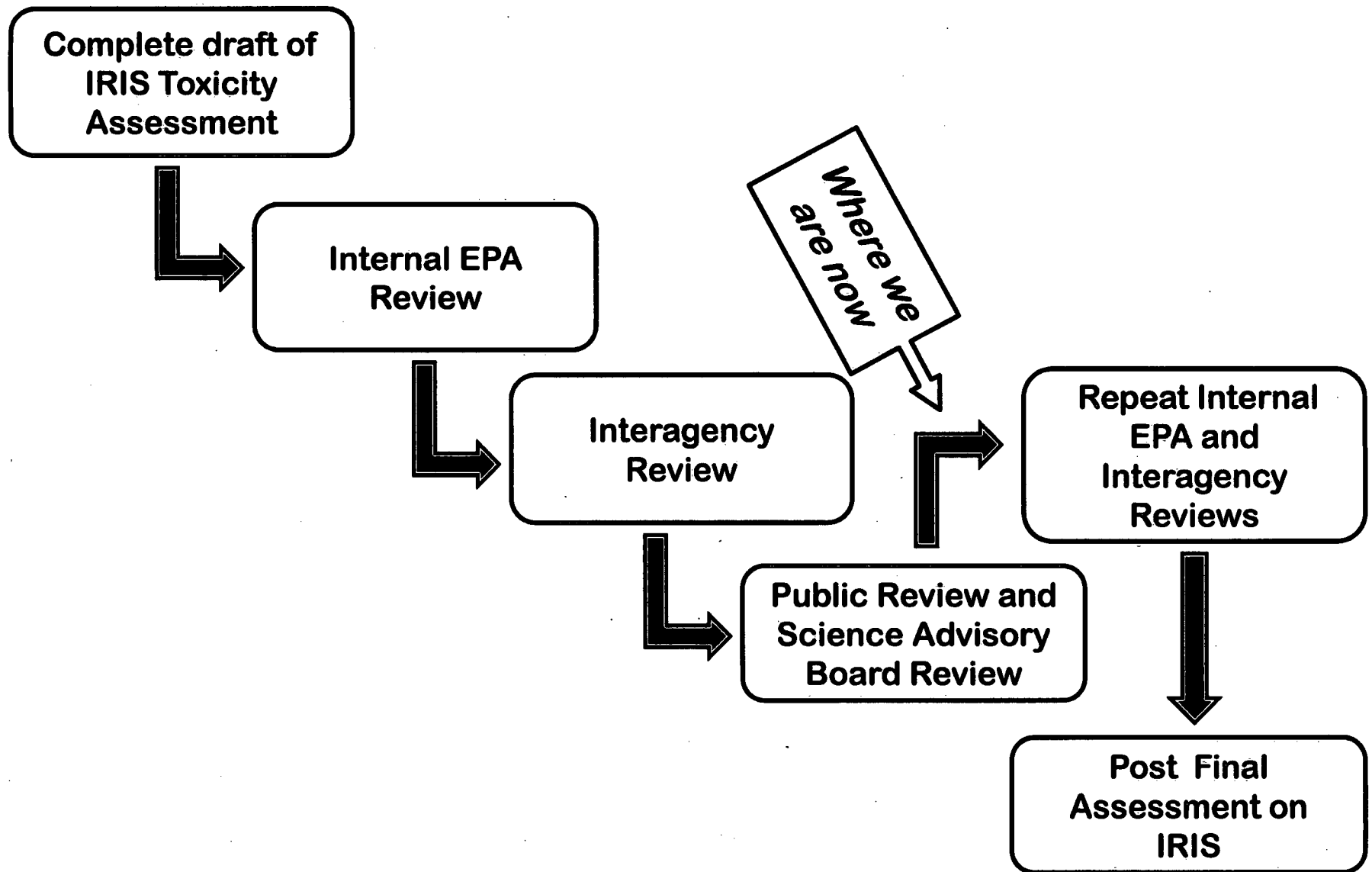
RfC = 0.00002 f/cc

(no existing IRIS RfC)

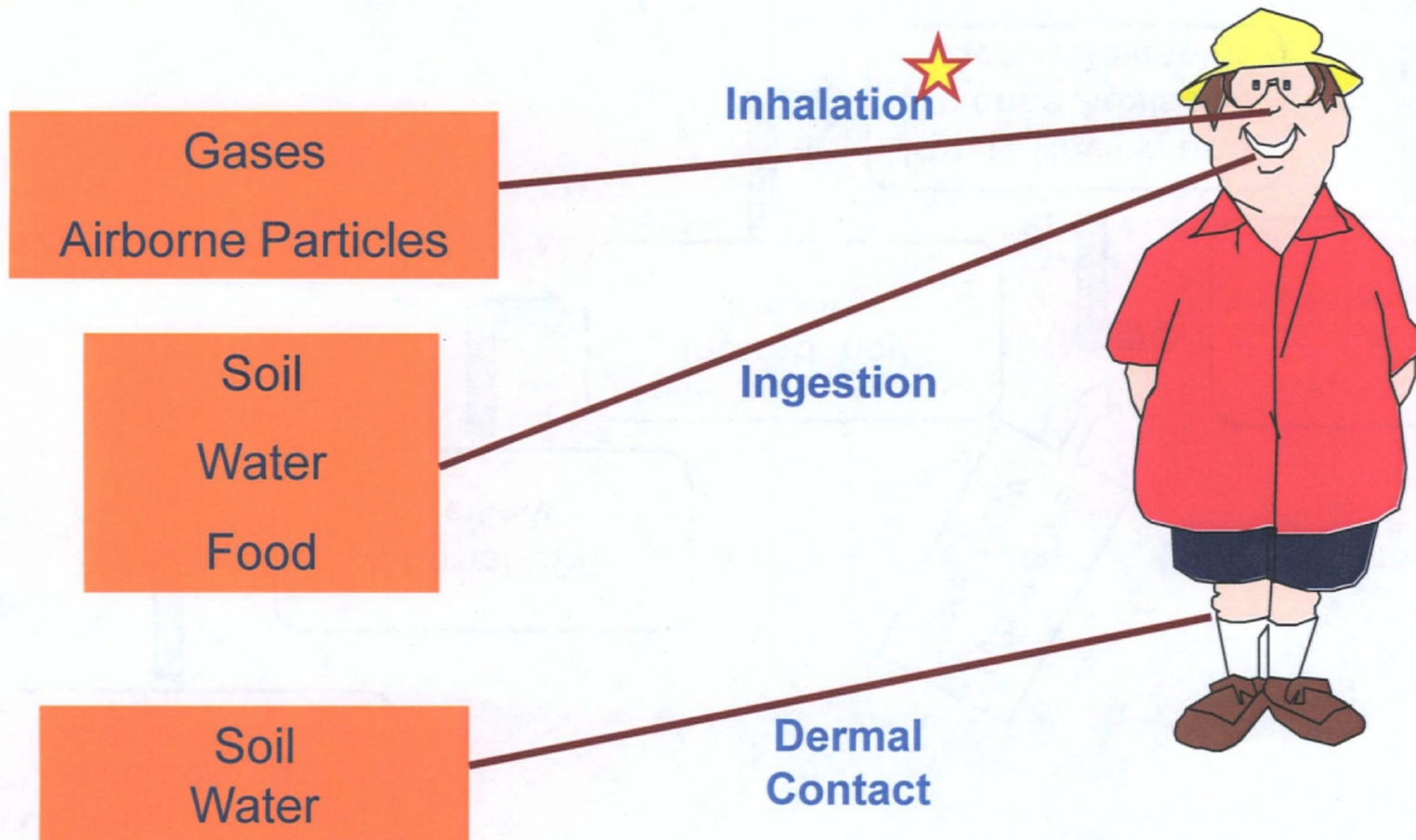
- **Marysville Vermiculite Processing Worker data**
- **Based on localized pleural thickening – the most sensitive endpoint**



IRIS Development and Review Process



Exposure



Exposure Assessment



- Utilize concentration of contaminant in media (fibers in air) and exposure estimates to calculate dose for chemical(material) of concern
- Add all exposures and all complete pathways

Summary of ABS Scenarios

Ambient Air

10 years, 6 Libby locations, 3 Troy locations
Helena and Eureka

Recreational, Outdoor

Hiking/camping in forested areas – OU3 and OU4
Hiking along Rainy Creek
Fishing/boating along Kootenai River
Mototracer
Bike Paths
ATV riding in fields and forested areas

Wood Harvesting

Cutting and hauling firewood
Commercial logging
Hand tree felling
Hooking and Skidding of felled trees
Site restoration activities
Chipping
Mechanical processing

USFS Worker, Outdoor

Forest management
Cutting fire lines

Driving, Biking, etc

Rainy Creek Road
Libby Roads
Troy Roads

Residential

Passive – Indoors
Active - Indoors
Mowing, Digging, Raking - 5 soil conditions
Gardening – 5 soil conditions
Child soil playing – 5 soil conditions
Child playing - gravel driveway

Occupational, Outdoor

16 Occupational settings

Occupational, Indoor

23 Occupational settings

Schools, Indoor and Outdoor

Kootenai Valley Head Start
Libby Elementary School
Libby Middle School
Libby High School
Libby Administration Building

Background

10 Locations throughout valley
6 Borrow pits

Target Risk Range for Cancer Causing Chemicals

1×10^{-6} to 1×10^{-4}

**1 additional cancer case in 1 million people (1×10^{-6}) to
1 additional cancer case in 10,000 people (1×10^{-4})**

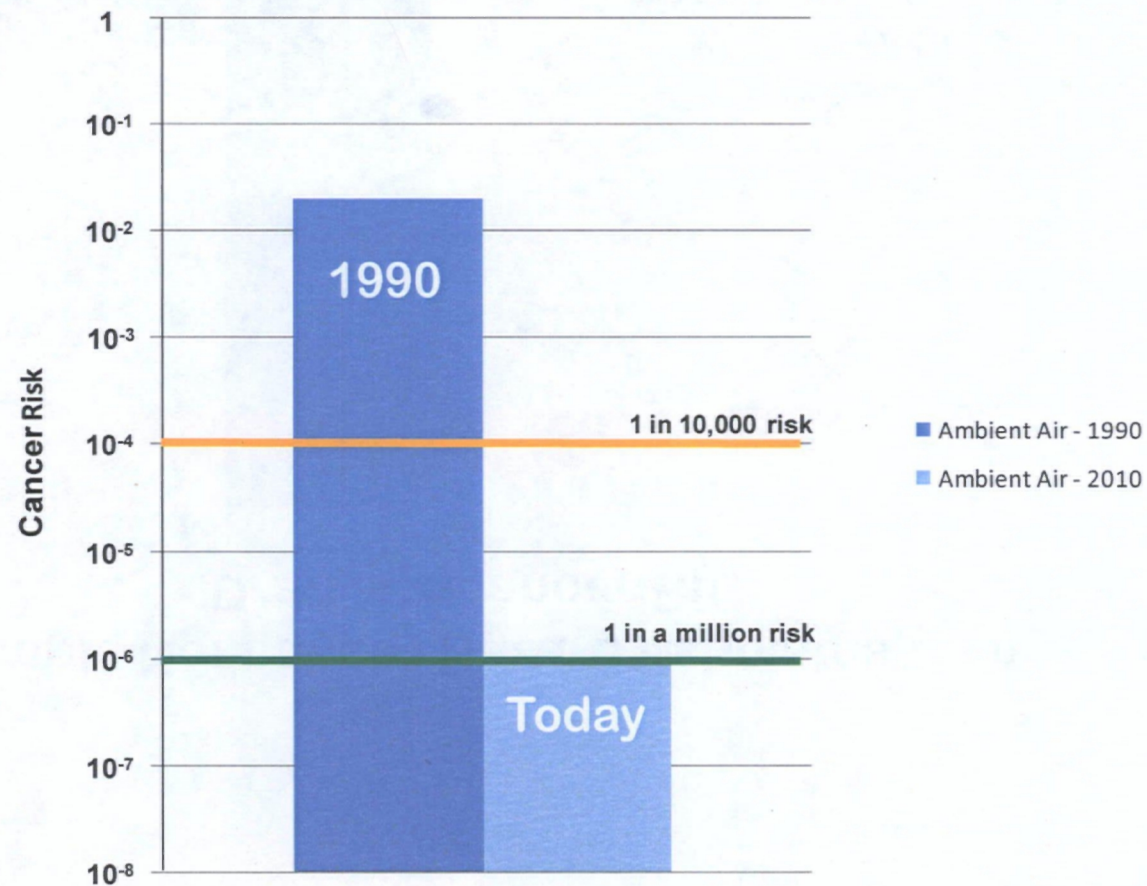
Target Hazard for Noncancer Chemicals

Hazard Index = 1

- **A level at which it is unlikely that even sensitive populations will experience adverse health effects such as localized pleural thickening.**
- **If the hazard index exceeds 1, there is an increased potential, or possibility, for adverse health effects.**
- **A hazard index greater than 1 does not convey the certainty of adverse health effects.**

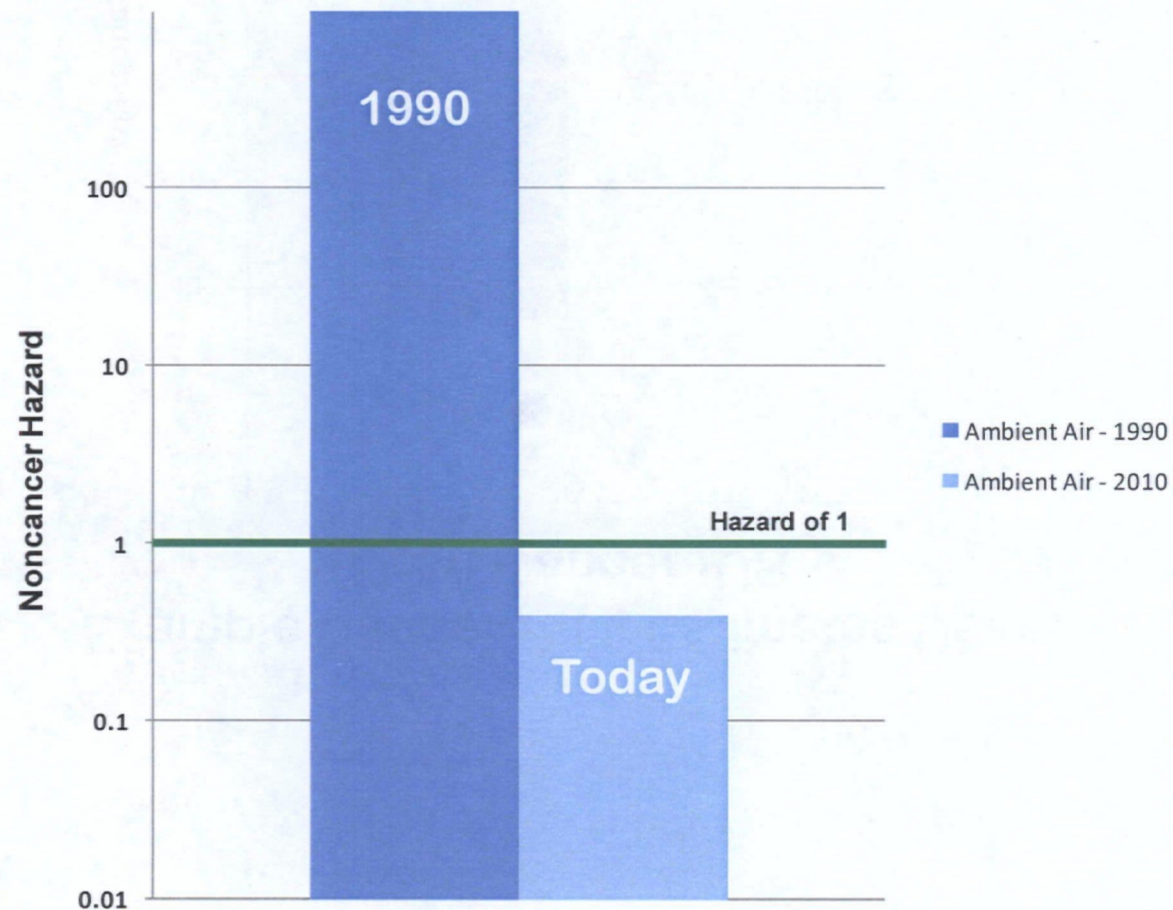
Ambient Air

Example Cancer Risk Estimates Using Draft Cancer IUR



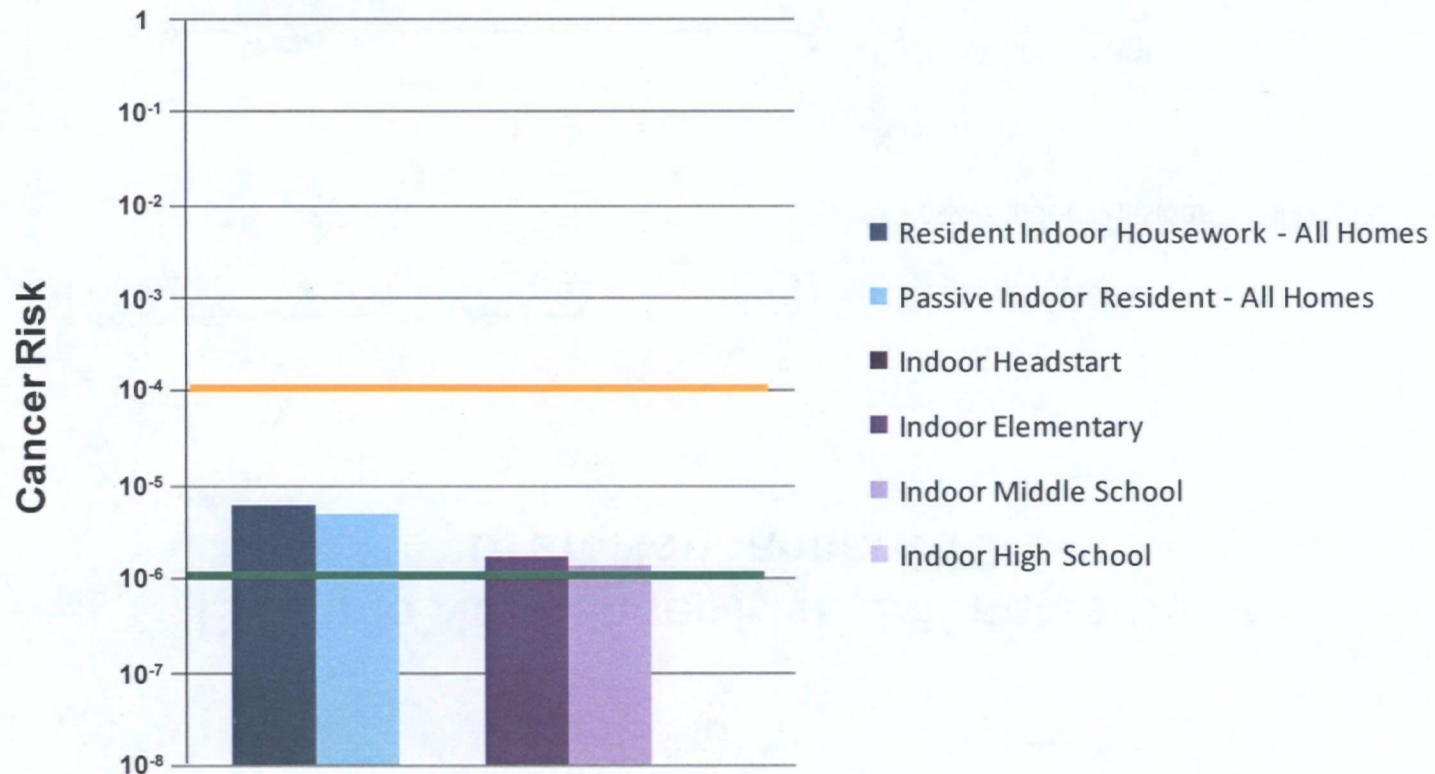
Ambient Air

Example Noncancer Hazard Estimates Using Draft Noncancer RfC



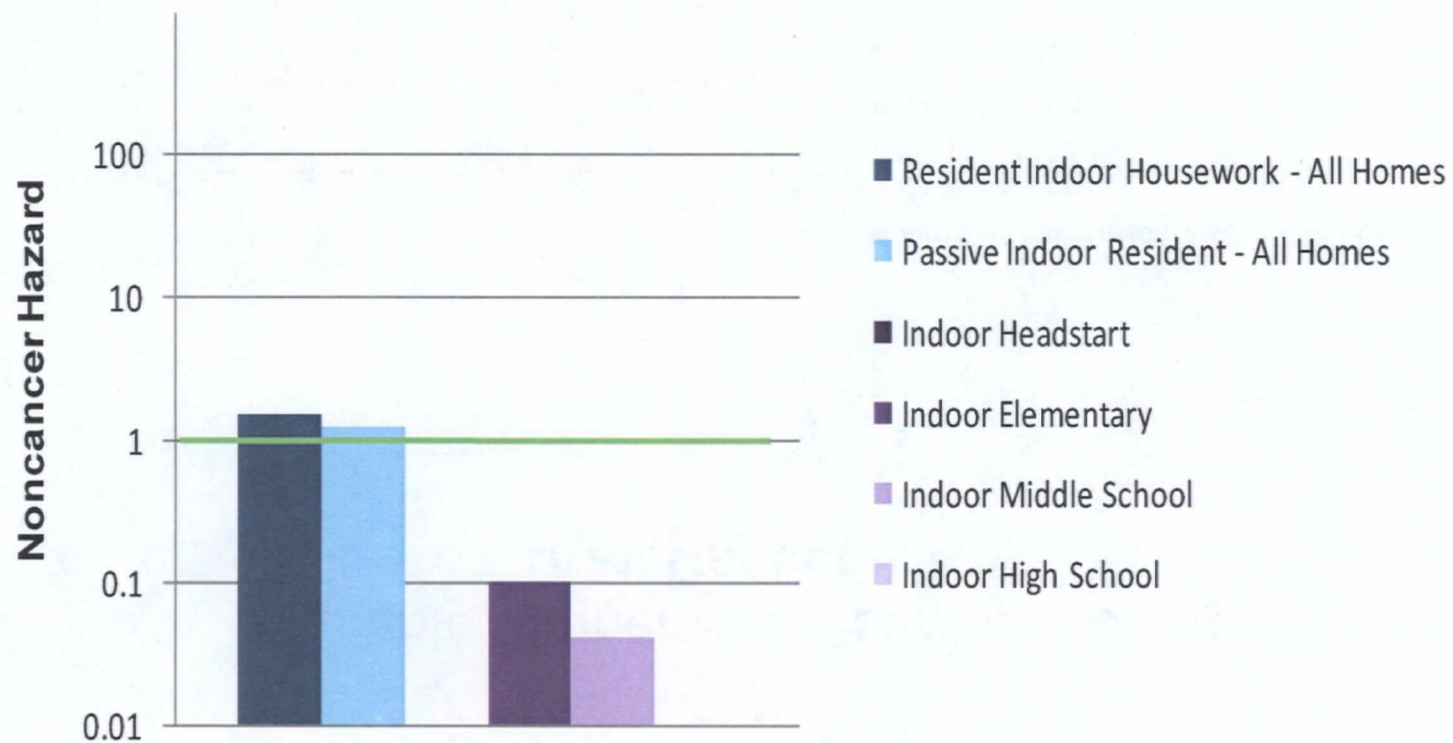
Indoor Resident and School Child

Example Cancer Risk Estimates Using Draft Cancer IUR



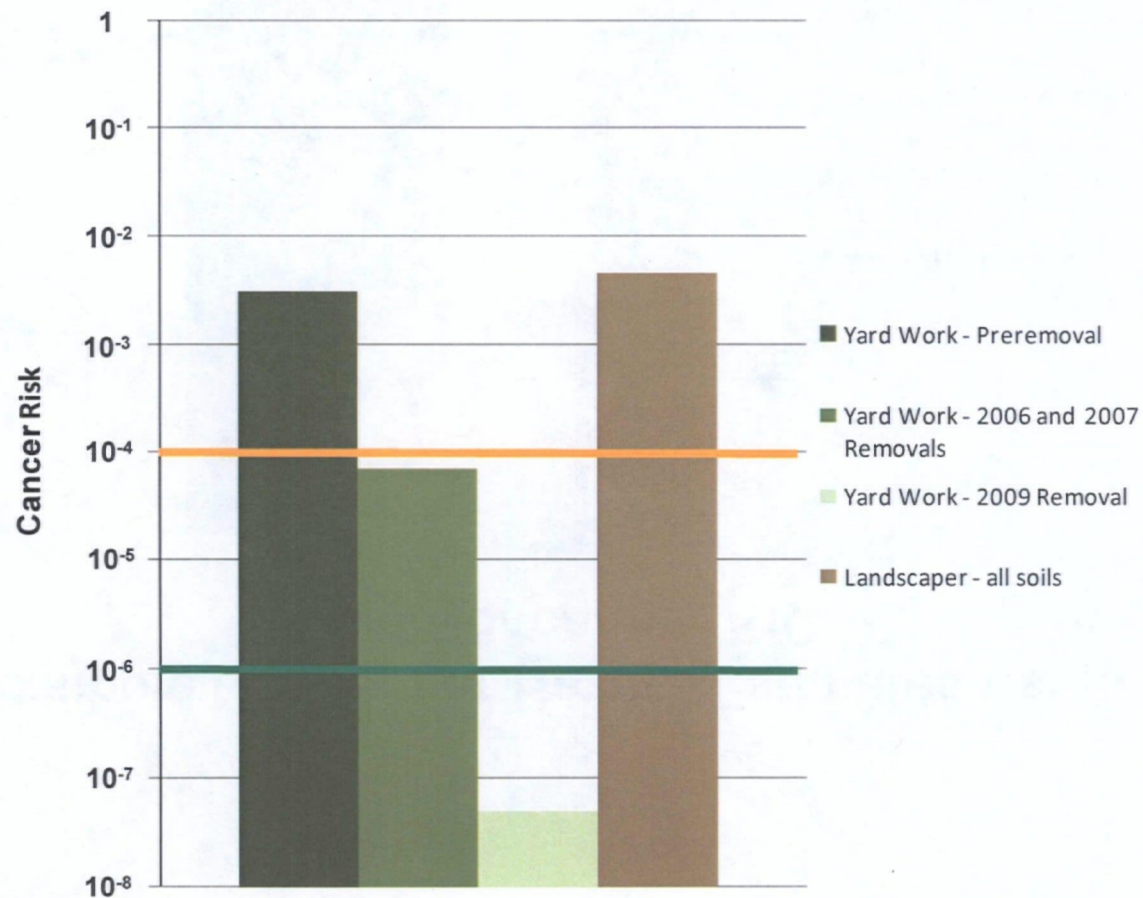
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Example Noncancer Risk Estimates Using Draft Noncancer RfC



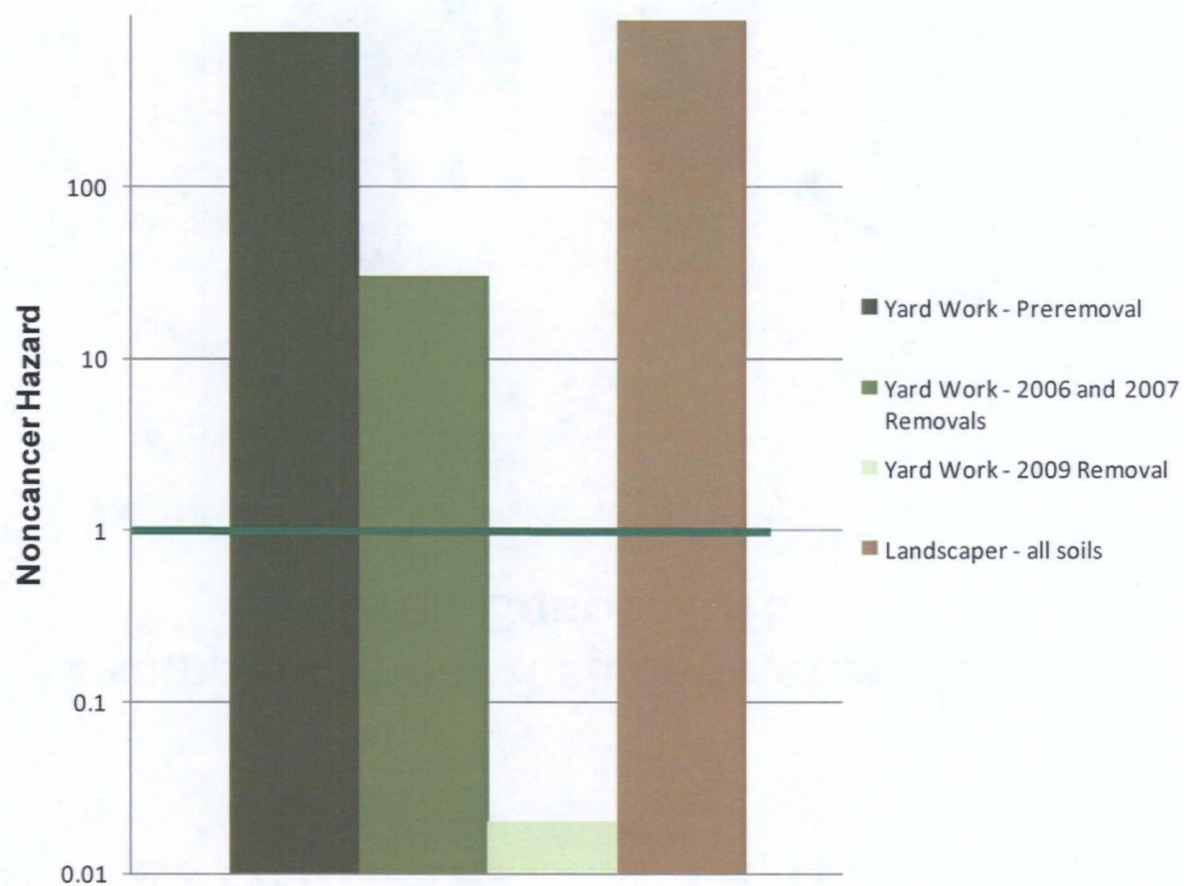
Residential and Commercial Yard Work

Example Cancer Risk Estimates Using Draft Cancer IUR

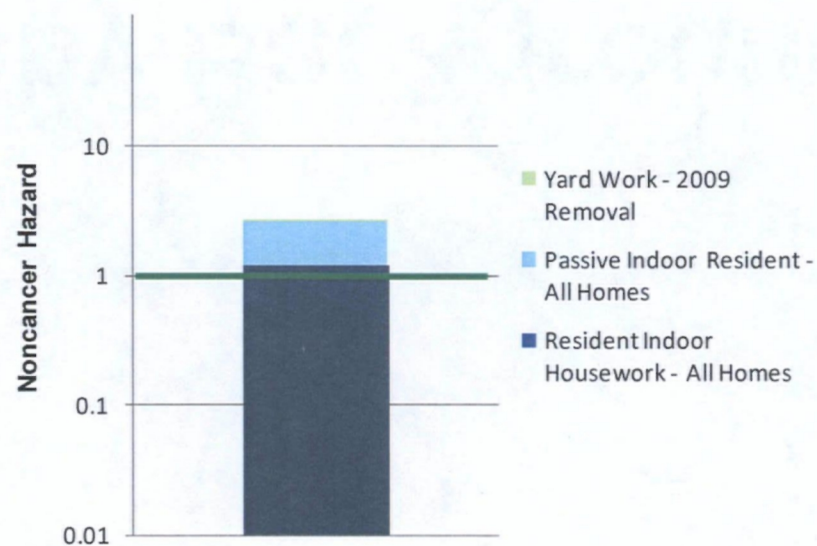
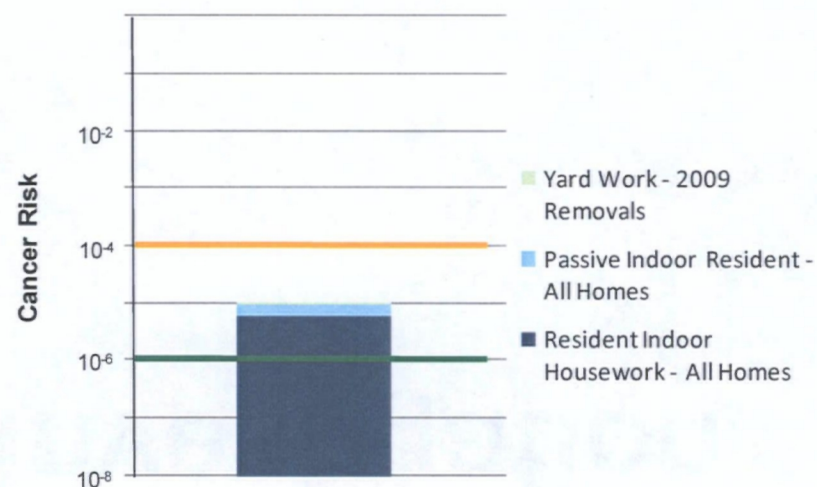


Residential and Commercial Yard Work

Example Noncancer Hazard Estimates Using Draft Noncancer RfC



Cumulative Estimates with Draft Toxicity Values Adult Residential Exposures



Libby Background Investigation

CERCLA § 104 Response Authorities

(3) LIMITATIONS ON RESPONSE.—The President shall not provide for a removal or remedial action under this section in response to a release or threat of release—

(A) of a naturally occurring substance in its unaltered form, or altered solely through naturally occurring processes or phenomena, from a location where it is naturally found;

(B) from products which are part of the structure of, and result in exposure within, residential buildings or business or community structures; or

(C) into public or private drinking water supplies due to deterioration of the system through ordinary use.

(4) EXCEPTION TO LIMITATIONS.—Notwithstanding paragraph (3) of this subsection, to the extent authorized by this section, the President may respond to any release or threat of release if in the President's discretion, it constitutes a public health or environmental emergency and no other person with the authority and capability to respond to the emergency will do so in a timely manner.

Comparison of Ambient Air in Libby, Eureka and Helena, MT

	Average Air Conc. f/cc	Lifetime Noncancer HI	Lifetime Cancer Risk ^c
Libby	5×10^{-6} ^a	0.2	8×10^{-7}
Eureka	2×10^{-6} ^b	0.1	3×10^{-7}
Helena	9×10^{-6} ^b	0.4	1×10^{-6}

^a f/cc of Libby Amphibole

^b f/cc of Amphibole

^c Calculated with new IUR

Summary

- **Toxicity Assessment (document summarizing IUR and RfC) ready for interagency reviews late Fall, 2013.**
- **Calculations using the draft Libby amphibole IUR and RfC result in risk and hazard estimate above targets for receptors engaging in prolonged activities (at very low asbestos concentrations), many that involve disturbance of soil (short durations, high asbestos concentrations).**
- **The forest around the mine (OU3) will continue to be a source of contamination.**
- **Characterization of Libby amphibole background levels may inform risk management decision-making for the Libby Superfund Site.**